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The Redwoods—a Suggestion.

EVERY one who knows California knows the beauty of the Redwood forest and the value of Redwood lumber, and all Americans should know that the Redwood forest is the richest and most important coniferous forest in the world. It stretches in a maritime belt from the borders of Oregon on the north for several hundred miles southward to the southern confines of Monterey County, California. It is not wide, as the Redwood does not flourish beyond the influences of sea-fogs or ascend to greater altitudes than 3,000 feet. It is unusual, therefore, to find these trees more than thirty miles from the coast; and they grow to the greatest perfection on the banks of streams and the slopes of low cañons facing the sea. Sometimes, especially at the north, the Redwoods form pure forests, their tall shafts standing close together in such dense phalanxes that only Ferns can grow in the perpetual shadow of their spire-like heads; and sometimes they are mingled with Spruces, Firs and Cedars in more open forests which are the favorite home of the Tan Bark Oak. No other forest of conifers is so sublime, and no other forest is so productive. The productiveness of these forests is almost incredible. Fifty thousand feet, board measure, of lumber have been frequently cut from one Redwood trunk, and single acres have produced 1,000,000 feet of lumber, or the yield of some 250 acres of the rich pineries of the south-Atlantic and Gulf states.

Surpassed in bulk of stem only by the Sequoia of the Sierras and in height * by some of the Australian Eucalypti, the Redwood is without a rival in stately beauty; and the Redwood forest is one of the wonders of the world, and man in his short-sightedness is going to destroy it. Redwood lumber, which is the best building material in the Pacific states, is valuable for innumerable purposes, and the Redwood forests are melting away as fast as human energy, aided by steam and the most perfect machinery, can destroy them. Already this wonder of the world, this great national possession, has passed from the control of the Government into the hands of lumbermen and speculators, and the story of this transaction is not always a pleasant one. The title to land covered with Redwood trees has sometimes been acquired honestly, but a considerable part of this great timber belt has undoubtedly been stolen from the Government by means of dishonest entries, made possible by the defective and foolish land laws of the United States and the dishonesty of its civil officers; and now it is impossible to find between Smith River and Punta Gorda a single entire section of Redwood forest controlled by the Government. Nor has the Government secured anything like a fair money value for this priceless possession, Redwood land having all been sold at prices varying from $1.50 to $2.50 an acre; and the nation's loss from its bad management of this narrow stretch of the public domain alone cannot be less than $100,000,000. Fortunately, there still remain in the hands of lumbermen vast stores of Redwood timber, and, unless the construction of a ship canal across the Isthmus widens the demand for Redwood lumber in the eastern states and Europe, many years will pass before the Redwood forests are finally destroyed. The Redwood, too, is fortunately possessed of a surprising vitality which enables it to keep up a brave fight against its human enemies. Cut down it springs up again with many vigorous shoots from the stump, and some of these shoots from trees cut near San Francisco forty years ago are already a hundred feet high and promise to grow to a great size. The fires which lumbermen set to clear away the débris of branches and bark before they are able to cut the trunks into lengths suitable for handling, carry desolation in their path, but do not destroy the vitality of the Redwood stumps, which, before a year has passed, are clothed with vigorous shoots. These first operations of the lumberman, reckless and extravagant as they are, do not utterly destroy the forest, which, if it could now be left to itself, would in time recuperate. But the land which bears these great trees will produce crops of grass, and this stretch of the California coast is the best dairy region in the state, so that when the logs have been hauled away to the mill, the ground between the stumps is usually roughly plowed and planted with Grass seed; every Redwood shoot is destroyed as fast as it appears, and at the end of three or four years the reproductive power of the roots is destroyed.

As we have said already, the supply of Redwood lumber is so great that, under existing conditions, it will last for many years, but this forest is the property of individuals who have acquired it for what they can make out of it. Its length of life, therefore, will be dependent on the exigencies of commerce. For purposes of local taxation, land covered with Redwood is valued at something like its market value, and to save the payment of these taxes timber is sacrificed in a ruinous competition which destroys without adequate return. It must be evident, then, that the Redwood forest in its primeval splendor is doomed, and that, sooner or later, the time will come when it will be represented by only a few tattered remnants of its former glory. With it will pass one of the marvels of the world as stupendous in its way as any of the scenic wonders which Americans now count among their great treasures. The wisdom of the nation has set aside for all time a great stretch of the Sequoias of the Sierras that future generations of men may know these trees, but no provision has been made for preserving any part of the Redwood forest for a similar purpose, although one Sequoia forest is as important and interesting as the other, and both are equally wonders of vegetable life. Twenty-five years ago, before lumbermen had learned the value and location of these forests, and the ease with which they could be secured, Congress, without expending a dollar, might have made a great national Redwood park in which all the beauties of this forest might have been preserved forever, but this opportunity is lost. The expenditure at this time, however, of half a million dollars, either by the nation, the state of California or by some rich man or group of rich men anxious to do a great public service, would even now buy enough Redwood-covered land somewhere north of Cape Mende-

* See page 42 of this issue.

cino to secure a park large enough to preserve the features of this forest. Could this be accomplished—and all that is needed to bring it about is the banding together of a few men and women zealous for this particular cause—the time would come after these great forests have disappeared when such a Redwood park would be one of the most interesting and instructive sights in the world and one of the glories of the United States. To those who have wandered among these mighty trees built up by the slow growth of centuries and felt the inspiration of their solemn beauty, the destruction of the Redwood forests seems to be a sacrilege which never should have been allowed, and, certainly, if some small part of it is not preserved, a great wrong will be done to the world, which will lose, with the passing of the Redwoods, one of its fairest possessions.

The Height of the Redwood (Sequoia sempervirens).

IT has usually been considered by the students of our trees that the Sierra Sequoia was the tallest, as it is the largest, tree in North America. Three individuals, each 325 feet high, have been measured in the Calaberas Grove; and these, so far as I have been able to learn, are the tallest American trees whose heights have been authoritatively recorded. On the 7th of last September, however, General Henry L. Abbot, Mr. John Muir and I were on Eel River, near the lumber-camp at Scotia, California, and measured a Redwood which had lately been felled, and which led us to suppose that this species grows to a much greater height than any other American tree. This particular individual was only 662 years old, with a trunk diameter of ten feet five inches at six feet above the ground, and of nine feet fifteen feet above the ground; it measured 230 feet to the first limb, where the trunk was two feet nine inches in diameter and 340 feet to the top of the stem. In trunk diameter it was smaller than the average size of the trees in this particular forest, which extends without a break for about twenty miles along both banks of the Eel River; its height was not exceptional and may be taken as the average height of the trees in this forest; and the men in this camp who pass their lives in working among these trees were confident that individuals one hundred feet taller than the tree we measured could be found. This, perhaps, is not improbable, as Redwood trunks from fifteen to twenty feet in diameter are not rare, and occasional trees with trunks from twenty-two to twenty-five feet in diameter can be found. Judging by the fact that the Eel River trees, which had grown in a deep alluvial deposit, had only attained a diameter of ten feet five inches in 662 years, some large Redwoods must have lived through several centuries and reached a much greater height.

Of other trees measured in this forest one was forty-three feet in circumference at five feet above the ground; another was forty-five feet in circumference at the same height, and another fifty-two feet five inches. The trunk of another measured four feet three inches in diameter 180 feet above the ground.

C. S. S.

Notes of Mexican Travel.—XII.

MY SUMMER IN THE VALLEY OF MEXICO.—II.

THE Pacific slope of the Serrania de Ajusco is likewise of volcanic character. About six miles east from Cuernavaca, at its foot, a stream of lava two miles wide ran down over the valley. Here, at an elevation of but 5,000 feet, prevail different climatic conditions from those of the Valley of Mexico; hence we find these lava-beds occupied by a subtropical forest with trees of considerable size, and in this shelter find shrubs and herbs which are the denizens of warm lowlands. On several trips to Cuernavaca at intervals throughout the summer I could not fail to explore these lava-beds, and I was always repaid by numbers of interesting plants. One of the most showy of these by reason of its clustered stems, three or four feet tall, terminating in racemes of scarlet flowers, a truly striking plant, was a Lamourouxia of recent discovery, L. Nelsoni, Rob. & Greeum. The deep-wooded and wet barranca leading from near the town up into the heart of the mountains continued to be an attraction on these visits to Cuernavaca and to yield, as last year, new species, among which I may mention a second species of Coulterophytum.

When I arrived in Mexico City at the end of May the hillsides in view in all directions were still brown, and it was not till the middle of July that the tardy rains brought out their verdure, consequently my attention was given during the earlier weeks of the season to such plants as grew about the wet meadows and the canals draining them. Following up my quest of these, we went one day by train of the Interoceanic Railroad to Ayotla, about forty miles south-east of the city, and situated, according to the map, on the north shore of Lake Chalco. We found, instead of a lake, only a grassy and reedy savanna, all the better, however, as a field for botanizing. On our way we passed extensive drainage works designed to convey the summer floods of Lake Chalco directly into Lake Texcoco. A few weeks later the opening of the canal was celebrated by a banquet, dignified by the presence of the President of the Republic. When the great drainage tunnel below Lake Texcoco shall be completed, nearly all the lakes of the valley will disappear, and in their places will stretch green pastures and fat fields of tillage. Lake Texcoco offers little of interest to the botanist, and presents no beauty, except when viewed from a distance. Surrounded by alkali flats, which are thinly covered with salt grasses and the few other plants common in such conditions, shrinking low during most of the year within margins of whitened mud, it is the great sink of all the valley.

In strong contrast with all this, however, is Lake Xochimilco, which lies close by the base of the southern hills and is fed by sweet mountain springs. It is separated from Lake Texcoco by the Hill of the Star and a row of volcanoes which are truncated cones, but discharges its waters into that lake by the Viga canal leading through the city. Lake Xochimilco is now but a shallow lake; indeed, as we look over its surface from the Hill of the Star, we see only a green expanse of sedges and reeds, except where its waters are led through artificial ways. On its southern border, hidden under trees except as to the domes and roofs of its few venerable churches, stands the Aztec town from which the lake takes its name. Two routes lead to Xochimilco town, one by boat through the Viga direct from Mexico City, the other by train to Tlalpam, thence on foot or in saddle five miles eastward, at first over an arenal or tract of volcanic sand, which yields its peculiar plants, and finally over a stone causeway lined on both sides by the fastigiated Willows commonly set on the banks of canals throughout the valley. Xochimilco may be called an Aztec Venice. Canals lead in all directions, and bronzed and bare-limbed Indians, the men and boys in white cotton and the women in blue scarfs and scarlet skirts, are deftly propelling their canoes or scows by means of poles and paddles. To this point are brought for shipment to the great city in scows all the products of the mountains to the south, and even from the tropic valleys below Cuernavaca, products of forest, field and village. If it is a market day, we find the town thronged with the Indians from many villages around. The streets and broad plaza are bright with crowds in clean, many-hued attire, and we see much manly beauty to admire, and confess the comeliness of many of these brown Indian maidens and matrons. Their wares in endless variety, products of rude handicraft, with grains, vegetables and fruits, fill the market space and are spread out in the shade of the broad Ash-trees of the plaza.

The lower part of the town is extended over the lake bottom. Here, as for a wide space outside, a network of canals has been dug. With the black humus from these, plats of land, irregular in form and varying in size from a rood to an acre or more, have been built up. These are

held together by the roots of Willows set on their margins, those singularly prim Willows which cast but little shade. As they are of richest soil and are easily watered by splashing or dipping water from the surrounding canals they are kept in constant cultivation and to their fullest capacity. Besides luxuriant crops of corn, garden vegetables of all kinds and choice flowers are grown here for the city markets. On many of the nearer of these plats stand by the water's edge, with canoes drawn up the banks before them, the pretty huts of the owners, the walls of which may be formed of the canes of Arundo neatly fastened in line, the thatch formed of its leaves or of marsh grass. Mere basket houses are these, yet they suffice for the simple needs of these happy children of nature. On several visits to these strange scenes we engaged Indians with their boats to convey us through the maze of canals to those more remote in pursuit of water plants or marsh plants. Besides the yellow-flowered Nymphæa Mexicana, a white-flowered one was common in still water, presumably N. tussilagifolia, Lehm. The flowers of the latter are carefully gathered and appear in great abundance in the flower markets of the city throughout most of the summer. Far more multiplied than these was Eichornia crassipes, Knuth, with lovely bluish flowers, of which sheets of blooming plants completely covered the surface of certain coves. The flowers of this plant being too delicate to bear handling like Water-lilies, the entire plant, carefully set in pots or baskets, is carried to town for sale. Along the banks of the canals stood the most stately and showy of Golden-rods, Solidago paniculata, DC.

As for the snowy mountains on the south-east rim of the valley, Iztaccihuatl and Popocatepetl, they were not to be included in the field of a single season. I only looked up at them on an autumn day from underneath the sombre giant Cypresses which crown the Holy Hill of Amecameca, scanning with somewhat of awe their vast slopes, cragged and furrowed indescribably.

After the middle of October the rainy season drew to a close. With the drying of the soil and the less interrupted sunshine most plants hastened to maturity and decay. A few, chiefly half shrubs, were making slow preparations for blooming in winter, according to their habit. I could not linger for these, since he who collects in botany must distribute also. So, on the morning of the 8th of November, I was compelled to turn from the valley which had yielded me so much pure delight, from its charm so difficult to define, to travel under skies growing leaden into our drear northern winter.

Charlotte, Vt. *C. G. Pringle.*

Lilium Humboldtii and Allied Species.

THE typical Lilium Humboldtii has a large ovoid bulb, more or less oblique, and occasionally prolonged laterally in a semi-rhizomatous manner. The scales are thick and the bulb very compact. In height the stem is often above four feet. I have seen it nine feet high, and in one instance a single stalk bore eighty buds. Ten or fifteen flowers in a panicle are common. The lower pedicels are longer, and growing gradually shorter form a broadly conical panicle. The flowers are large and of much substance, of a uniform rich reddish orange spotted with maroon and strongly reflexed. Nature has provided for the weight of the great panicles by giving this Lily a very stout erect stem, which is well furnished with leaves in full whorls.

In its native home in the foot-hills of the main Sierra Nevada, Lilium Humboldtii usually follows the belt of Yellow Pine, Pinus ponderosa, and grows in the open woods. It does not often grow above the four thousand-feet line, nor on the lower foot-hills. Just how far north it extends I have never been able to learn. I know of it in Tehama County, California, but have never seen nor heard of it in the Mount Shasta region. It has never been reliably reported from any point in the northern Coast Range of California, although I have recently learned of a Lily in Humboldt County which can only be L. Humboldtii or an unnamed species. Neither have I been able to learn of this Lily in the foot-hills of the lower San Joaquin valley, nor farther south than the Yosemite road. Generally it is strictly a mountain species, but there is one notable exception in the upper Sacramento valley. Some fifteen years ago it grew sparsely at one location in the Oak forest which borders the river. It is now abundant for twelve or fifteen miles along the river. In El Dorado County I saw it flowering to perfection last June. A fire had gone through some second-growth Pines a year or two before, and the magnificent panicles made a gorgeous display high above the Ferns and weeds. The top of the hill had been cleared some years before and was cultivated in grass and grain, but in the new stubble many stubs of the Lily stalks could be seen, and from wounds made by the plow the bulbs had been broken into groups of from two or three to a dozen bulbs. The Lilies are evidently on the increase under the conditions, and the bulbs were very healthy. As a cultural hint I would say that L. Humboldtii always grows on well-drained soil. The subsoil is usually rocky, the upper soil clayey or volcanic.

In southern California there are two other strongly marked types of Lilium Humboldtii. Of these L. Humboldtii, var. magnificum, is nearest the northern form. This superb Lily has a large bulb, which is usually broader and rounder than in the type, and which speedily turns purple on exposure to the air. At its best it is even sturdier in growth than the type. The foliage is similar, dark green and glossy; the stem is much darker. The flowers, while of the same form and borne in a similar deltoid panicle, are differently colored. At the middle of the flower the ground-color is a rich orange-red. The maroon spots are surrounded by a reddish circle. On the upper half the reddish circles become larger, until they merge into each other at points, making an irregular combination of dark maroon spots, red ocellations, and of dark reddish orange ground in blotches. This form of L. Humboldtii is found in the San Bernardino Mountains which make the southern end of the Sierra Nevada, in the Coast Range, as far north as Santa Barbara, in the Jacinto Mountains, and on some of the islands off the coast of southern California. There are some variations within this range, but I am satisfied that bulbs from all of these localities grown side by side would prove practically identical. From the cultivator's standpoint it is important to observe that while the L. Humboldtii of the northern Sierra seldom, if ever, flowers the first year, an ordinary bulb of the variety magnificum will bloom well the year it is planted, while even small bulbs of L. Bloomerianum almost always do. My information is that the variety magnificum usually grows in the deep débris near the streams in shaded mountain cañons.

Lilium Bloomerianum is to the variety magnificum as a pigmy to a giant. Two or three feet usually measures its slender pale stem, and it is sparsely flowered. The much smaller flowers have a paler orange ground and are not so richly colored. The ocellations and red-blotched apex of segments are the same. The bulbs are small, not averaging one-fourth the size of those of the other forms. I have referred before to the peculiar two or three jointed scales. I have seen bulbs in which nearly all of the upper joints readily rubbed off, leaving a mere stub of a bulb. L. Bloomerianum is found in the Pine belt of the high mountains of San Diego County.

The following figures, showing the average size of flowering bulbs of the forms of Lilium Humboldtii, may be of interest to some: In 750 bulbs of the typical L. Humboldtii 196 were from 9 to 12 inches in circumference, 351 from 8 to 9 inches in circumference, and 203 from 7 to 8 inches. The latter averaged 3⅔ ounces in weight; second size, 4¾ ounces, and largest size, 9 ounces, with a few 14 ounces in weight. Bulbs of L. Humboldtii, var. magnificum, measure about the same, excepting that a few exceed these measurements.

Large bulbs of Lilium Bloomerianum will measure 6 inches in circumference and weigh 2⅔ ounces. Very

many flowering bulbs measure 3 to 4 inches and weigh 1 ounce each.

Lilium Columbianum grows over a wide range of country and in many situations. It is found in Oregon from the coast line and the mouth of the Columbia River, throughout the Coast Range and in the lower portions of the Cascade Mountains. It reaches north-eastern California in Modoc County, and in the state of Washington is found in the southern part in about the same range as in Oregon. I have no accurate information as to how far it extends on Puget Sound, but it follows the Columbia River valley and is found in various portions of north-eastern Oregon, and is close to the Idaho line, to my knowledge. It prefers a sandy, well-drained soil among Ferns in open woods. It is easily grown in cultivation. L. Columbianum may be described as a miniature L. Humboldtii. The flower has reflexed orange-red segments, finely dotted. The stem is slender, and both it and the leaves are light green. The bulb is compact and ovoid, as in L. Humboldtii, but, unlike the latter, the scales are thin. Five hundred average bulbs measure as follows: 100, 4 to 5¼ inches in circumference, ¾ ounce each; 346, 3 to 3½ inches in circumference, ⅓ ounce; 54, 2¼ inches in circumference, ⅛ ounce. L. Columbianum grows from 1½ to 4 feet in height, and usually flowers the first year. I find sandy alluvium best answers its needs.

The bulbs of Lilium Bolanderi are almost identical with those of L. Columbianum. I have not flowered L. Bolanderi nor have I seen it in flower. It is described as being from six inches to three feet high and few-flowered. The leaves are whorled and the general habit seems to be similar to that of L. Columbianum. The flowers are, however, quite different; the segments are not reflexed, and the flower would seem to be broadly trumpet or bell shaped and nodding. A collector who saw it in full flower this year describes it as a very handsome flower of a pleasing red and growing in a high mountainous region in a soil of rocky débris and leaf-mold. Habitat indefinite, Humboldt and Del Norte counties, in north-western California.

In this group will fall a fourth species of the far north, related to Lilium Columbianum, and as yet unnamed. In this species the habit of L. Columbianum in bulb and leaf is combined with a peculiar-shaped flower. The lower half of the segments forms a closely constricted tube, from which the upper portion spreads horizontally in a rotate flower finely dotted with maroon. This species is nearly as fragrant as L. Parryi.

Ukiah, Calif. *Carl Purdy.*

New or Little-known Plants.

Tillandsia Dugesii.

A VERY beautiful Tillandsia has recently been received at the Gray Herbarium of Harvard University from central Mexico. The plant was collected in the mountains of Santa Rosa, Guanajuato, by Professor Alfredo Dugès, and it proves to be the rare Tillandsia Dugesii, described ten years ago by Mr. J. G. Baker.* Though Mr. Faxon's drawing (see page 45 of this issue) does not reproduce the delicate coloring of the plant it gives a good idea of its habit. The leaves are two feet long or more, densely rosulate, with narrowly ovate bases from four to six inches long and from two to two and a half inches wide, tapering to the elongated rigidly coriaceous ensiform-setaceous upper portion, which is convolute nearly to the tip. The leaves throughout are glaucous, with minute lepidate dots. The peduncle is much shorter than the leaves and is closely sheathed by bracts. The lower bracts are as long as the leaves, and like them are lepidate, but their bases are glossy and crimson. The bracts of the panicle are smaller and shorter, and toward the top of the panicle they become merely ovate with acuminate tips. The panicle is a foot or more long, consisting of from fifteen to thirty spikes, these spikes being about three inches long and scarcely an inch broad. The rachis is crimson and glossy. The flower bracts are one to one and a half inches long, ovate, acute, and strongly keeled on the back; they are either very sparingly lepidate or quite smooth, and of a peculiar greenish straw-color, shading to rose. The calyx is an inch long, composed of three lanceolate-acute conduplicate sepals with sharp keels. The corolla is about half an inch longer than the calyx, and apparently deep purple, with ovate-lanceolate obtuse blades. The stamens are a little shorter than the corolla. Mr. Baker described this species from a plant with neither corolla nor fruit, and as yet the fruit is unknown. The very long glaucous foliage and the brilliant peduncle and rachis make it a plant worthy a place in the greenhouse, and, though the specimen at hand is somewhat wilted, Mr. Cameron will attempt to grow it in the Botanic Garden.

Gray Herbarium, Cambridge, Mass. *Merritt L. Fernald.*

* *Journ. Bot.*, 1887, p. 278.

Foreign Correspondence.

London Letter.

Chrysanthemum Nipponicum.—This is a Japanese plant of considerable promise. It is closely related to the European Ox-eye Daisy, Chrysanthemum leucanthemum; indeed, it is catalogued by the Japanese nurserymen as Leucanthemum Nipponicum. Although described by Franchet in 1872 from specimens collected in Nippon by Savatier, it does not appear to have attracted the attention of European cultivators until 1895, when Messrs. Dammann & Co., of Naples, sent it out as a new plant. It is a perennial shrub about two feet high, with numerous annual stems not unlike those of the common Chrysanthemum, oblong toothed leaves, and numerous erect axillary scapes bearing each a head three inches across, with a large yellow turbinate disk and broad, overlapping, pure white ray florets. A German horticulturist speaks highly of it as a winter-flowering plant for the greenhouse. The cuttings are struck in April, and the plants treated as for the ordinary Chrysanthemum, housing them in the autumn to flower in December and January.

Hybrid Cinerarias.—Various crosses between distinct species of Cineraria have been made in England recently, and the results obtained are most gratifying. The most recent cross has been obtained by Mr. Lynch, Curator of the Botanic Gardens, Cambridge, who crossed C. multiflora, a native of the Canary Islands, figured in *The Botanical Magazine*, t. 4994, as Doronicum Bourgasi, with forms of the common Cineraria, supposed to be a garden evolution from C. cruenta, also a native of the Canary Islands. The first named has tall stems three to four feet high, with large orbicular leaves, the lower petiolate portion bearing lobe-like leaflets and large auricular clasping bases; the flowers are of a uniform soft mauve color, about an inch in diameter, and borne in very large sheaf-like clusters. The hybrids are mostly like C. multiflora in habit, but shorter, while the flowers are much larger and show variations in color similar to those of the other parent. Mr. Lynch showed his hybrids at the last meeting of the Royal Horticultural Society, where they attracted considerable attention. A remarkable circumstance in relation to these hybrids is that Mr. Lynch did not take any steps to prevent self-fertilization beyond covering the heads intended to be pollinated with muslin, in order to exclude insects. He says no further precaution, judging by results, appears to have been necessary. In no case was any true C. multiflora obtained from the seed saved, and therefore it may be assumed that this species is sterile to its own pollen, or, at any rate, pollen from another species was more effective. One of the best of the hybrids, named C. Lynchii, is remarkable for its numerous flowers in large loose heads and uniformly colored a most pleasing shade of bright rose-mauve, not the harsh mauve so prevalent in the garden Cineraria. It grows to a height of about three feet, and is therefore effective in the same way as C. cruenta, the type

Fig. 7.—Tillandsia Dugesii.—See page 44.

1. Plant, about one-fourth natural size. 2. Upper portion of inflorescence, natural size. 3. A flower, natural size. 4. A petal, natural size.

which at Kew is a most useful decorative plant for the conservatory.

POLYGONUM BALDSCHUANICUM.—I drew attention to this plant a few weeks ago when it was an attraction in the herbaceous collection at Kew. Some additional information is now published in *The Gardeners' Chronicle*, along with a reproduction of a photograph of a fine specimen of it grown by Monsieur Lemoine, of Nancy, with whom it has grown exceptionally well, planted at the foot of a dead Elm-tree, up which it climbed to a height of ten feet and

covered the lower branches with its twining stems, which bore all the summer multitudes of panicles of white flowers. This was its behavior at Kew, where, however, it was planted to scramble over a sheaf of "pea-rods." It is a hardy perennial with wiry stems, cordate deciduous leaves and Spiræa-like panicles of flowers. It is a native of Turkestan at an altitude of from four to five thousand feet, where it was found and introduced by Dr. Regel in 1882. It obtained a first-class certificate from the Société Nationale d'Horticulture de France in September, 1894.

Cyclamen persicum.—An interesting sport from the Persian Cyclamen was exhibited this week by Monsieur de Langhe, Brussels, under the name of C. Papilio. It differed from the usual form in having the segments of the flowers spreading horizontally instead of being perpendicularly reflexed, and in the margins being crisped and undulated. Six named forms were shown and they differed from each other in size, color and degree of crispness. Although quite distinct from any other hitherto known sport they were considered inferior in decorative value to the normal form, of which some remarkably fine examples were shown by Major Joicey, of Ascot. At the preceding meeting of the Royal Horticultural Society, Messrs. H. Low & Co. exhibited a sport with a curious feather-like secondary segment growing crest-like from the middle of the normal segment. This character is reproduced in the majority of the seedlings obtained from seeds saved from these feather-crested forms. It will be interesting to watch the development of these two sports. So far as I know, C. persicum has not been crossed with any other species of Cyclamen.

Late Chrysanthemums.—The two best that I have seen this season are W. H. Lincoln and Princess Victoria, the former a Japanese reflexed, very floriferous, the color a brilliant deep yellow, and the flowers lasting a month or more. It forms a very shapely bush when grown on what we call the natural method, and is in every sense a most decorative conservatory plant during December and January. Princess Victoria is also Japanese reflexed, the flowers large and full and pure white. It is at its best in January, and unless visited by heavy fog it lasts well. It was shown as a new variety in 1892, when it obtained an award of merit. I recently noted that Madame Therese Rey, a white Japanese, is at its best in January. Late-flowering varieties deserve more attention at the hands of breeders than they have yet received. We have numerous varieties which flower soon after midsummer and very useful they are, but good sorts to flower in January and February under ordinary treatment are still a desideratum with flower growers.

London. *W. Watson.*

Cultural Department.

Close Root-pruning for Trees.

THE radical change in the method of transplanting trees from the nursery to the orchard, which has been within a few years past advocated by Mr. Stringfellow, of Texas, has set many tree planters to thinking and experimenting. The counsel to beginners used to be to get all the roots possible when the tree is set out. Mr. Stringfellow claims that this is unnecessary, and that, in fact, the tree will make a better growth if the roots are about all removed, and the top, of course, removed, at the time when it is set in the orchard. The tree then becomes practically a cutting, and it will begin at once to throw out the necessary supply of young and active roots, with a top to correspond. The practice of Mr. Stringfellow is to leave only an inch or two at the base of the old root, to furnish surface from which new ones will put forth.

In order to determine whether the method would be suitable for this climate, an experiment was begun on a small scale last spring, in which four trees each of standard and dwarf Pears, Early Richmond Cherry, German Prune, Peach and Quince, were selected for trial. The trees were two years old and as even in size as it was possible to get them. Two trees of each of these varieties were pruned so that not more than an inch or two of the roots remained, and the tops were entirely removed, leaving only a stick. A hole made with a two-inch stick was all that was needed in setting them out. The other two trees were planted in the ordinary way, leaving the entire root-system. Before planting, the trees were all photographed, and after they had completed the season's growth they were taken up and again photographed.

The result of this experiment showed that the Peach was capable of producing a magnificent root-system and a top to correspond, even after being deprived of all its roots and branches to begin with. The dwarf Pear also made a fine growth, producing a finer root-development than the trees which were not pruned. The standard Pear was not quite as good, and the German Prune and Cherry were next in order. The Cherry made very little growth, barely enough to maintain life. The Quinces both died.

While this experiment shows results favorable to close root-pruning, it must be borne in mind that the season was exceptionally favorable for this work, as there were timely rains throughout the growing season. A dry season might produce entirely different results; for that reason we shall continue the experiment for a series of years and on a larger scale; so far it simply shows what these trees will do when treated in this way under favorable conditions.

La Fayette, Ind. *J. Troop.*

The Hellebores.

IT is the intention of these notes to mention more especially the true garden Hellebores or varieties of Helleborus niger, commonly known as the Christmas Rose, but as there are several plants grouped together under the common name of Hellebore, and as some of these have been the means of bringing these beautiful winter flowers into bad repute, it may not be time wasted to consider the synonymy of these popular names.

In the first place, the Helleborus niger has no part in the composition of the insect powder sold under the name of Hellebore powder. This is made of the Veratrum album, or White Hellebore, as a basis, its properties of destroying caterpillars being well known. The North American species, V. viride, is also used, but is said to be less effective in results. The Winter Hellebore is the pretty little Eranthis hyemalis, or Winter Aconite, and there are two Orchids from which the French Helleborine is obtained, namely, Serapias lingua, a native of south Europe, also another Helleborine obtained from the genus Epipactis. Thus we see that under one generic term, Hellebore, we have plants that represent three distinct families, and this is a good illustration of the futility of popular names for plant identification.

Helleborus niger is so called from its black root-stock; it is the Christmas Rose of gardens because it flowers at that season if given treatment so that its flowers may expand at midwinter without the blighting influence of severe frosts such as we experience in New England. In the latitude of New York I have grown these plants and had them flower admirably out-of-doors, though only in certain seasons. It is far better, however, to grow them wholly in frames, where they can be shaded in summer from strong sun, for if left undisturbed in such a situation, and protected in winter from cold, there is no difficulty in having flowers of spotless purity at Christmas, when they are most acceptable. It is possible that in the near future we shall see them grown in great quantity for the Boston market, as some of our commercial growers are preparing to have them in quantity, for only in this way can an impression be made. There is every reason to believe that the venture will be a success by having enough plants to lift half each year to produce a crop of bloom and let them rest the year following while taking in the other half.

Of Helleborus niger there are at least half a dozen well-marked forms cultivated in gardens. There is the narrow-leaved form, Angustifolius of English gardens, and another similarly named of Scotch origin, the latter having its white flowers tinged with rose. Altifolius, also called Maximus, has flowers five inches across, and often three on a stem. There is, too, an intermediate form known as Caucasicus, the still better-known Madame Fourcade, with snow-white petals, and lastly, Major, which rivals in size the giant Altifolius. Thus it will be seen that a collection of the form of H. niger alone make a most interesting group in themselves, and are really decorative subjects for the winter season when a little care is taken to supply their needs. It may be said of the whole genus that they dislike disturbance at the root more than most plants do. After division or removal it is often a year or two before they fully recover, hence the need of either planting in pots for plunging or frame treatment all the year, as noted.

Besides the true Christmas Rose, there is another section of the genus that has been developed from the different species

that are scattered all over Europe and extend into Asia Minor. There are about ten species from about as many different countries, and under garden culture a race of plants has been produced which are much superior to the species themselves. Of these the best are F. C. Heineman, Frau Irene Heineman, Apotheker Bogren, Doctor Schleicher Albin Otto, W. Schmidt, Commerz, Benary and Hofgartner Hartwig. These are all of German origin, and with their species flower about Eastertime in the open ground; it is possible to grow them out-of-doors the year round if a little protection is given to the evergreen foliage in fall in the way of dry leaves or hay to help collect the snow round the plants. They are, indeed, very suitable for planting as an undergrowth for trees or shrubs that would furnish shade in summer, while they do not rob the soil of so much moisture as to impoverish the Hellebores. A good soil rich in vegetable humus is well adapted to their growth; a top-dressing of leaf-mold will best aid in keeping the plants in vigor, and it should be left as a mulch rather than spaded in and mixed with the soil, as there is danger of disturbing the roots by this operation.

Two species of Hellebore are found wild in Great Britain, though possibly not indigenous. Helleborus fœtidus is of a semi-shrubby habit and a plant of great decorative value on account of its fine foliage effects in winter; the other species, H. viridis, is similar, and both have green flowers that are the least desirable feature of the plant, their foliage being more ornamental.

Hellebores bear seed freely, and this may be sown preferably as soon as ripe, or some time will elapse before the young plants appear. But as both the winter and spring flowering sections cross readily, it is possible by forcing one and retarding the other to hybridize the two sections and get very desirable plants. Strong plants are readily separated, and this is the best way to increase any desired variety.

South Lancaster, Mass. *E. O. Orpet.*

Pandanus.

FEW plants are more useful or better known than Pandanus Veitchii and P. utilis, though it is hardly clear why these are so generally grown, and other distinct and beautiful species of the same genus are neglected. True, these two species will endure more hardship, but some others are equally good decorative plants. P. ornatus is a handsome species with rather broad, bright, shining green leaves, furnished with white spines. The marginal spines are strong, but those along the midrib are somewhat minute. The leaves are more erect than those of P. utilis, and their growth is not quite so rapid. P. glaucus grows compactly and has shining bluish-green leaves, furnished with white spines. P. lævis is a tall-growing species with the screws occurring closely; the spines are sharp, brownish green, the lower ones on the midrib curved, and often alternately recurved. P. Pancheri looks much like a green P. Veitchii, only the leaves are narrower. P. Javanicus variegatus is one of the most beautiful of all the varieties; the leaves are long, narrow and somewhat drooping; the ground-color is bright green, with bands of white traversing the entire leaf.

These are a few of the more distinct forms, and all are of comparatively easy cultivation. Screw Pines (as they are commonly called) seldom flower under greenhouse treatment or until they have attained considerable size, so that it is hard to procure seed from this source, though seed of the more commonly grown sorts can usually be procured from seed stores. But this method of increase is seldom resorted to, as offsets are easily procured from most of them. The offsets should not be taken at too small a stage; they root quite readily, but the crowns must be kept well up to avert the danger of damping. They may be inserted in an ordinary propagating-bed, or singly in small pots in a mixture of sphagnum and sand, and potted on when well rooted. In shifting large plants it is a good plan to use some antidote to acid in the compost, such as charcoal, as there is nothing so injurious to these plants as sourness in the soil. Large shifts or frequent repotting is unnecessary, as they need comparatively little root-room in proportion to the size of the plant, but when potting they should be set well down in the pots, as they incline to push themselves up out of the soil. Roots are quite freely sent out from the stem at the base of the old leaves, and in their downward course they sometimes need to be guided a little so that they will not run outside of the pot. Some soft tying material should be used, so that there will be no danger of cutting the roots. Some growers do not syringe during the winter months, as the water is apt to accumulate at the axils of the leaves and cause decay, but if a minimum night temperature of sixty degrees can be maintained and fresh air often admitted, there will be little danger from this source, and an occasional syringing helps to keep the plants clean. The most injurious insect enemy is scale, which quickly disfigures the leaves if allowed to get a footing. But these plants are not particularly subject to pests. An occasional sponging with water and whale-oil soap is a preventive. To bring out the true characters of the variegated forms the plants should be kept moderately shaded. If exposed to strong light the colors lose their brightness to a considerable extent, the white assuming a greenish hue and the green becoming lighter.

A plentiful supply of water is necessary during the summer months, but in winter less is required, unless the plants are exposed to the drying influences of fire-heat and the lack of atmospheric moisture. These conditions should be avoided as much as possible, as they do better in a moist atmosphere.

Tarrytown, N. Y. *William Scott.*

Onions.—Every one who has adopted the plan of sowing Onion-seed in boxes and then transplanting the young seedlings, is convinced that in one respect this is preferable to the old way of sowing the seed in drills where the plants are to remain. Not one-sixth as much seed is needed as with the old method, and the little labor involved in pricking out the young plants is more than offset by the great saving of time in weeding and thinning under the old system. Hardly any manual work in the garden is more troublesome than weeding among small Onions, but when the ground can be cultivated several times before they are set out many of the weeds are killed, and, besides that, the young plants are of a sufficient size to be seen, and there is less trouble in working among them. By the new plan, as it is called, although it has been practiced for a good while by individuals, an even crop is always assured and the plants are less liable to attacks from cut-worms and wire-worms. We sow the seed about the middle of February in ordinary seed-boxes, with a compost of loam with dried and pulverized manure, and we set the boxes on the shelf of a cool house. About the middle of March these boxes are transferred to the frame and the plants are hardened off gradually. The young plants are set out early in April in rows two feet apart and six or eight inches between the plants, according to the variety. Where space is valuable the rows may be left eighteen inches apart, but it is much more easy to cultivate between wider rows. Every variety I have tried is improved by transplanting, and all mature earlier than when they are treated in the old way. Our best keeping varieties as well as our best-flavored ones last year were Prize-taker, Ailsa, Craig and Cranston's Excelsior. The two last-named are superior English varieties. Silver King and Giant Rocca will grow to enormous size under this treatment, but they are not good keepers. For a general grade we use Yellow Danvers and Red Wethersfield. As a rule, white varieties do not keep well, the best we have tried being the Queen.

Taunton, Mass. *W. N. Craig.*

Correspondence.

The Choke Cherry in Cultivation.

To the Editor of GARDEN AND FOREST:

Sir,—Recent notes in GARDEN AND FOREST, as well as other sources of information, seem to indicate that the Choke Cherry is unknown to cultivation. Such is not the fact, although its use is apparently limited and local. One of the earliest recollections of my boyhood has to do with two or three Choke Cherry trees beyond the garden in the edge of the old orchard, and I can almost feel their pucker yet, and I recall the feeling of danger when some older companion would utter the grave warning never to drink milk after eating choke cherries. These could hardly be called cultivated choke cherries, however, and the trees were simply spared where they had chanced to spring up.

In distinct contrast with this puckering little fruit I call to mind another kind, always spoken of as the "tame" choke cherry. The merits of this fruit may have seemed greater than the reality, since none of it was to be found on our own farm. Still, any boy would call this fruit good, and when prepared for the table boys still call it good, no matter what may be their age. The botanical characters of the tree appear to be the same as those of the wild Choke Cherry, Prunus Virginiana, though the tree reaches a larger size than that commonly reached by the shrubs along the fence rows. In this cultivated form the trunk often reaches a diameter of from

four to six inches, and the tree attains a height of fifteen to twenty feet.

The fruit is much larger than in any wild forms which I have seen, perhaps ranging from three-eighths to half an inch in diameter. It also has much less astringency, and whatever remains of this entirely disappears with cooking. The fruit is much used both for pies and sauce, and is also canned for winter use. Any criticism as to its quality in these forms would be that it lacks in pronounced flavor rather than that it possesses any strong or unpleasant ones. It does not make a rich sauce, but one which is, on the whole, very cooling and agreeable.

It is not necessary to cook the fruit in order to dispel its astringency. Those most familiar with its use have learned that when the fruit is fully ripe, if it is put into a cloth sack and rolled back and forth or shaken in a closed vessel, this quality disappears. Treated in this way and served with sugar and cream, like peaches or other fresh fruit, it is a dish by no means to be passed by. I do not remember that the fruit was ever used for jelly, but, of course, it might be and perhaps is.

There are certain qualities possessed by this fruit which seem to make it worthy of being better known than it now is. In the first place, it ripens at a time when other cherries are gone. Furthermore, the tree is uniformly productive, seldom, if ever, failing to yield a crop. Although small, the fruit is borne in clusters, so that it is quickly and easily picked. It also has the quality of remaining a long time on the tree after ripening, which is a desirable feature for home use. The tree is apparently well able to care for itself, for all of those which I have observed have been growing absolutely without care. It seems further that it must have few serious enemies, otherwise it would not prove so uniformly productive. As to its longevity I cannot testify. Among the trees of my earliest remembrance several are gone, while others, when I last saw them, were still yielding their annual crop of fruit.

The chief objection against this little recognized claimant for admission to our gardens is its small size and the consequent number of pits. If the suggestion of one of your correspondents for a pitting machine were to take tangible shape it would add greatly to the importance of this fruit. Indeed, there seems to be no reason why such a machine should not be as readily devised for cherries of this size as for larger ones. It is possible that the same machine might answer for both, for in size these fruits are about intermediate between the wild choke cherry and the Early Richmond. As commonly served the pits are left in, and in that case it becomes largely a question of leisure, for while they are easily removed it takes time to do it.

So far as I have learned the history of this fruit from inquiries made in northern Pennsylvania where I have known it, the original trees were brought to that region from Connecticut by one of the older settlers. The trees sprout from the roots to some extent, and these sprouts have served as a means of distribution in this farming community, so that it is not at all an uncommon fruit in that immediate vicinity. As to its remoter history I know nothing. Probably it is merely an improved form originally selected from some hedgerow. The variation in size of fruit which these wild groups present certainly lends color to such a supposition.

University of Nebraska. *Fred W. Card.*

Notes on the Hybrid of Maize and Teosinthe.

To the Editor of Garden and Forest:

Sir,—In the American Museum of Natural History, New York City, there is an ear of corn displayed in the room on the ground-floor at the left-hand side of the main entrance which was collected by Carl Lumholz, the explorer, among the timid Tarahumara Indians of Mexico. It is identical in all respects with the form which I described in Garden and Forest (vol. ix., page 522), as produced by crossing, for three seasons successively, Teosinthe and Maize. It is interesting to note the occurrence of this form among a wild tribe which comes little in contact with white men.

Dr. Nicolas Leon, of Mexico, informs me that this hybrid is encountered among the Mixes and the Zapotecs inhabiting the state of Oaxaca, and that there it is called Maiz de los gentiles.

Another interesting fact concerning Maize and Teosinthe is one made known by Dr. William Trelease, of the Missouri Botanical Garden. It is well known that Corn smut, Ustilago Zea-Mays, fastidiously confines itself to the Maize-plant, being found on no other plant. Dr. Trelease discovered that it also grows parasitically on Teosinthe, a fact which also points to the close affinity of Maize and Teosinthe, if they are not identical.

University of Pennsylvania. *J. W. Harshberger.*

Meetings of Societies.

The Nebraska State Horticultural Society.

THE twenty-eighth annual meeting of this society, recently held at Lincoln, was devoted largely to forestry and landscape-gardening. In the first paper presented, Mr. Peter Youngers, of Geneva, spoke of the trees which had proved especially adapted to the conditions and climate of Nebraska. The American Elm leads all other trees as a shade-tree for that state, although, of course, it is not as good as some others for its timber. The Honey Locust and the Green Ash have been almost universally satisfactory, while the Scotch and Austrian Pines in their younger stages are thrifty growers. The Black Walnut flourishes in moist soil, and the wild Black Cherry makes a rapid growth for a hardwood tree, although it has suffered from sun-scald during recent dry years. There has been an astonishing mortality among Mulberry-trees during these same dry years. Mr. Harrison, of Weeping Water, also spoke in high terms of the Honey Locust, especially for its power of resisting drought.

Dr. C. E. Bessey, in speaking of the distribution of the forest-trees in the state, defined native trees as all those which were found here by white settlers, although it is possible that the Indians may have introduced some of these. Pinus ponderosa has come down the streams from the west, and remnants of these trees are found much farther eastward than they now grow. Some discussion about the Diamond Willow followed, and persons most familiar with the woodcraft of the state were evidently not ready to relinquish their belief in this tree as a distinct type or species. Many others thought that its peculiar formation is due to individual peculiarities or the work of insects. Dr. Bessey gave an interesting account of the range of most of the well-known trees of the state, and, among other things, he stated that the Hickories have had a very hard time in Nebraska, and for the most part only creeping up the streams a little way.

Professor F. W. Taylor made a trip through Russia last summer, and in speaking of horticulture in that country he stated that little fruit is grown in the latitude of St. Petersburg—a few strawberries and fewer bush fruits, and no apples whatever. The latter fruit is hardly seen as far north as Moscow, although the traveler going south begins to come into the region of cherries at this point. The Cherry-trees are all short-lived, grown on their own roots, and new sprouts are allowed to come up about the base to take the place of the old trunk as soon as that fails. It is not probable that these trees would last ten years in the climate of Nebraska, being all dwarfs of the English Morello type. Russian varieties of Apples are very local, and they are poor, as a rule. There are no great nurseries which serve as centres of distribution, and therefore these varieties are confined largely to the immediate sections where they originated. This is the reason for the confused and hopeless state of the nomenclature of the Russian fruit-trees which have been sent to this country. No doubt, some of these Russian fruits have enabled the farmers of the northwest to grow some kind of an apple in a more trying climate than would have been possible with our ordinary varieties, but the more we know of the Russian Apples the less we find in them of value.

Dr. Ward talked in an entertaining way of the impressions which he had received of the forest-gardens of the Harz Mountains. This region is some fifty miles long and half as broad, and one who looks from the summits of the ranges is impressed by the smoothness of the landscape and the checkered appearance of the woods made by the alleys running between forest blocks. These alleys run perfectly straight without regard to the contours of the land, and are kept clean and free from all vegetable growth. The squares are of different sizes, but all the trees in the same square are of the same size. For a small fee people have permission to gather limbs or forest material from the ground, but no axe is allowed to be taken into the woods. A cart for carrying away the collected material may be brought and left at the roadside, but cannot be taken into the forest. Trees to be cut are marked by the forester and the measure is recorded, so that when the wood is piled up at the roadside the amount must correspond with the measurement. At various points selected with reference to their soil and aspect there are clearings for the homes of the foresters surrounded with beds of forest seedlings. The woods are very carefully protected against any intrusion, no one being allowed to light a fire anywhere, with no smoking even in the grass by the roadside, and no hunting except by Government permits issued to the foresters and to individuals at a certain fee. Visitors, however, can go where they will,

and even in places where there are fences to keep the game there are gates to admit passing through. Good roads are necessary in good forestry, and therefore there are public highways through the forests, macadamized, well-drained, carefully guttered, and having easy grades. These are kept in perfect condition, swept and raked after rains, so that nothing remains on the surface. Besides these there are ordinary dirt roads, carefully laid, beautiful footpaths two or three feet wide, and railroads provided for travel through the mountains, even where their construction has not yet been needed.

Professor Card spoke of landscape-gardening as a fine art which ranked with painting, sculpture and architecture, and after a brief historical sketch he said that the work of the landscape-gardener was to produce nature-like effects—that is, to compose a picture which interprets nature rather than one which imitated nature slavishly. A landscape-painter can vary the forms of his trees to meet the demands of his picture, can introduce a mountain background or a wandering stream, but a landscape-gardener is held in by stricter limitations. He cannot even select a single point of view, as the painter can, but must present his picture from every direction. Besides this, the painter completes his picture as it is to remain forever, while the gardener must work with constantly growing materials in such a way that they shall always be presentable, and, if possible, so that they should always improve. Professor Card's lecture was illustrated by lantern slides, which showed the qualities of some of our best trees; some examples of ancient topiary work, and the accomplishments of some of our modern expensive styles of carpet-bedding, contrasted the freer forms of natural planting. Pictures were also exhibited to show how highways, school-grounds, cemeteries and home-grounds could be made more attractive.

Mr. J. A. Hogg, in giving his experience with orchards in the south-central part of the state, said that the trees in that section were headed low (1) to prevent hail from striking the body of the tree, since borers are likely to enter wherever the bark is bruised; (2) to prevent sun-scald; (3) to protect the roots from the sun's heat; (4) to protect the tree against wind so that the pollen will not be blown away nor the fruit blown off; (5) to make fruit-gathering easy. The best fruit in that region is found on the lower limbs of the trees. In gathering cherries it is oftener necessary to lift up the limbs than to use a ladder to reach them. Russian Mulberries and Honey Locusts, being free from insects and furnishing abundant nectar for bees, make desirable wind-breaks. On the north side of a Mulberry hedge, Currants, Gooseberries and June-berries will do well. A row of three-inch tile under every row of trees or bushes for the purpose of subirrigation has proved useful wherever tried.

Mr. L. M. Russell, in giving his experience with Peaches, said that he had sold 12,000 bushels last year, and that 3,000 more rotted on the trees owing to the ravages of a black fungus which was most severe on common varieties. He thinned away about half of this fruit and he ought to have picked off half of what remained. The trees are now planted fourteen feet by eighteen, although they were originally planted much closer. The Wright has proved their most profitable variety, although it is late.

Mr. H. F. McIntosh, of Omaha, in speaking of the horticultural press, said there were some forty publications in the United States nominally devoted to horticulture or some of its branches, but most of these belonged to the class known as "house organs"—that is, they are papers connected with and managed by commercial establishments. Many of them are good journals, and they can afford to be, since they offer an opportunity for the publishers to send out advertising matter at one-tenth of the postage which it costs to send out catalogues and circulars. About one-third of these publications have a circulation so small that it is not rated, and our very best ones are not liberally supported. Horticulturists especially do not support these publications as they should.

Professor Sweezey, in speaking of the conservation of rainfall, says that the evaporation from the water surface at Lincoln last year was forty-four inches. The year before it was forty-eight inches. The reason for this great amount of evaporation is the dryness of the air, the windiness of the climate and the high temperature. Of course, where moisture is so much needed in the soil, every effort should be made to preserve it, and he repeated the reasons for surface tillage as a check to the waste of water.

Dr. Bessey advocated attempts at reforesting the sand-hills of Nebraska, which, in fact, were not all sand. The valleys between the ridges formed pockets with little ponds of water in wet times. The sand in the hills is not always drifting sand and it is not always poor. The hills are covered with grass, and this is heavy in the valleys. There are wild Plum-trees in the moist spots, and the Lead-plant is often found on the slopes. The grass is never dense, but is tenacious enough to hold the sand from blowing, and furnishes a large amount of pasturage. There are remnants of former Pines scattered over the regions which are not all worthless land, and should be made more useful. The valleys are very rich, but when the sod is broken on the hills the sand begins to drift. Dr. Bessey thinks it ought not to be more expensive to start a productive forest in these sand-hills than it was to cut away the forests for agriculture in the older states. Pine timber grows on thinner soil than this in Michigan, and there seems to be no reason why it should not grow here after it is properly started. Altogether he considers the problem well worthy of state or government investigation.

Recent Publications.

A Popular Handbook of the Ornithology of Eastern North America, by Thomas Nuttall. Second revised and annotated edition. By Montague Chamberlain. With additions and one hundred and ten illustrations in colors. Little, Brown & Co. 1896. 2 vols., 8vo.

Nuttall's fame, though resting mainly on his botanical writings, owes much to the *Manual of Ornithology*, the first volume of which appeared in 1832 (with an enlarged edition in 1840) and the second in 1834. The cause of the popularity that this work immediately obtained is not far to seek. It was the first handbook of the subject, and presented it in an extremely attractive manner, combining a sufficiently scientific account of our ornithology, with a series of charming sketches of bird-life that have rarely been excelled. The work had been long out of print, when in 1891 the publishers decided to issue a new edition, and Mr. Chamberlain was entrusted with its preparation. The work before us is a revised issue of this edition, with a few changes and additions, including the introduction of the colored plates.

The classification and nomenclature of Nuttall's work have become antiquated, and many new species have been added to the list of our birds since he wrote. In the new edition it was decided to intercalate descriptions of these additional species and to give such information about the others as had been acquired since Nuttall's day. At the same time it was deemed advisable to exclude a few species occurring only west of the Mississippi, thus making a complete handbook of the ornithology of the eastern faunal province.

These variations from the original work are clearly indicated by typographical means, and come within the scope of editorial function, but one would have supposed that Nuttall's text in other respects would have been reverently treated. A comparison, however, of this edition with the original shows that many liberties have been taken. Whole paragraphs have been omitted in many of the biographies, with nothing to indicate such omissions. In fairness it must be added that these excisions have been judiciously made, and nothing of real importance has been lost, but when one finds that such things are done he cannot help feeling that he is being treated to a réchauffé from which, while he may praise the cook, he cannot trust himself to judge the flavor of the original dish. Against such a mode of serving a classic we must protest.

But, apart from these considerations, the work is an excellent guide to the study of our birds. Mr. Chamberlain's notes, though not copious, are sufficient to put the student in possession of what he should know of the recent studies in the subject, and his additional biographies are faultless. The handsome typographical dress makes the volumes a delight to the eye, and the colored plates, made up of figures copied mostly from Audubon and Wilson (though this is nowhere stated), add to the attraction of this revised issue. It merits, and will doubtless find, a wide circulation.

Notes.

We have often commended Kœlreuteria paniculata, an ornamental tree of the second size, for its graceful foliage, especially in the earliest stages of its growth, and for its abun-

dant yellow flowers in midsummer. *Meehans' Monthly* adds to this commendation that in the fall of the year its rich crimson foliage vies with that of many of our American trees which have been celebrated in this respect. We should like to hear from correspondents, especially from those living south of this latitude, whether the leaves of these trees with which they are familiar take on this rich autumn color. We have not observed it in trees about here.

A cold wave has once more left the northern part of Florida covered with ice. So far as can be learned at this time the disaster to Orange groves was not nearly as sweeping as the great freeze two years before. Indeed, there were comparatively few trees in bearing, although in the old groves which were cut to the ground, root-sprouts have already reached a height of ten to fifteen feet. Prudent growers early in the winter wrapped the stems of these young trees with Palmetto leaves, straw and burlaps, which must have proved a great protection; and those who had not already taken this precaution had ample time to protect their groves after the weather bureau had warned them of an approaching cold wave. Fortunately, the low temperature was only of short duration. The extreme of cold was reached at six o'clock of last Thursday morning, and by nine o'clock the weather was rapidly moderating all over the state. No doubt, exposed buds and foliage were frosted, but let us hope that next year's crop will not be sensibly diminished. The blow was most severe upon the growers of early vegetables for northern markets. Throughout the northern part of the state truck-farms will need to be generally replanted.

Professor Georgeson, of the Kansas Agricultural College, in offering to send samples of the Soy bean to farmers of that state, gives in *The Industrialist* some account of the experience with this crop, of which several acres have been grown on the college farm for the past six years. Even in the years of severest drought the crop has not failed completely, and last year a yield of sixteen bushels an acre was harvested on the 31st of August, from ground seeded on the 19th of May. This crop is especially valuable since it can be grown on stubble-ground from which wheat and oats have been harvested and a fair yield secured. In feeding value the Soy bean takes precedence of linseed-meal, and is more valuable than any other concentrated food that can be found in the markets except cotton-seed meal, and this is sometimes poisonous when fed to pigs. The Soy bean contains two and a half times as much protein and five times as much fat as wheat bran, and it contains a greater percentage of protein than linseed-meal, and twice as much fat. Soy Beans are planted in rows thirty-two inches apart, and they are cultivated a few times to keep down the weeds and retain the moisture in the soil. Altogether this bean is one of the most promising of the additions to farm crops for the middle west, and it is likely to be more and more valued as its virtues are understood.

Last year three species of Xylina, commonly known as green fruit worms, large, light green caterpillars, did a great deal of damage to the apple crop by eating holes into the sides of young fruit in May and early June. These caterpillars are from an inch to an inch and a half long, and they have not appeared in dangerous numbers in the region infested this year since 1877. They begin to eat one side of the fruit, and continue until something like half of it is eaten, and then go to another one, thus injuring several fruits. They are not found on the trees after the middle of June. Fortunately, these caterpillars are inviting to the birds, and they suffer from parasitic insects, so that it is not certain that they will appear in dangerous numbers another year. Their attack would have been a serious matter last year but for the unusually heavy crop of apples throughout this state. After they begin to eat the apples there is little use in spraying them, but if the trees should be sprayed at least once, as is always advisable, with Paris green and Bordeaux mixture before the blossoms open, some of the worms might be killed. After the fruit sets the only successful and practical way of fighting them is to jar them off into sheets, as is done with the curculio. The soil should then be thoroughly cultivated during the summer, for this will kill many of the insects which are undergoing their transformation. Bulletin No. 123 of the Cornell Experiment Station, by Professor Slingerland, is devoted to this pest.

Newtown pippins, at forty cents to one dollar a dozen, are seen in some of the fruit-stores. Winter Seckel pears may be had for sixty to seventy-five cents a dozen, Winter Nelis at seventy-five cents to one dollar, and Easter Beurres for $1.25. Large and bright-colored hot-house strawberries find buyers at $2.00 a cup, and well-grown Lady Thompson berries, from Florida, neatly laid in oblong splint baskets holding more than a quart of the selected fruit, cost $1.00. Most of the Florida strawberries have been immature, lacking in color, and without much demand. Some forty boxes of mangoes were recently received from Jamaica by a wholesale merchant. Retail sales are almost entirely confined to former residents in the West Indies, though the distinctive fragrance of this stringy fruit tempts occasional buyers to try it as a novelty. New limes are coming from the Bahamas. A novel display in one of the fruit-stores was a bunch of grape-fruit, six of the heavy fruits closely clustered together on one stem. Florida Russet oranges now sell at wholesale for $4.00 a box, and "brights" for $4.50, though higher prices are occasionally asked by some foresighted dealers as the end of the season is approaching. Florida grape-fruit, in the desirable sizes of fifty-four and sixty-two fruits to a box, costs as much as $13.00, or nearly twenty-five cents each, to the retail dealer. The same sizes of Jamaica grape-fruit are quoted at $8.00 to $9.50 a box. Very large and extremely small sizes bring much less, especially the latter, which are prematurely gathered.

The snowy, sunless days of last week were accountable for a large stock of cut flowers of second and third quality, which were offered by the street venders on Saturday, when milder weather set in. Roman hyacinths and lily-of-the-valley, looking chilled and drooping, sold at ten cents for a bunch of less than a dozen stalks, three or four Meteor roses also brought ten cents, and small bunches of violets cost twenty-five cents. But these low-grade blooms are at best an unsatisfactory suggestion of the fresh and delightful flowers shown in large variety in the stores. White snapdragon, great spikes of mignonette and smaller ones of ordinary varieties, pansies, candytuft, jessamine and strikingly beautiful blooms of a large strain of Marguerites were displayed in one of the Broadway windows on Saturday, together with cut branches of the delicately foliaged and flowered Acacia dealbata. Single hyacinths of graded shades of lilac and purple, pansies, forget-me-not and the yellow variegated Bouton d'Or carnations, white and purple lilacs, and the orange and scarlet fruits of Bitter-sweet were all represented. The double flowers of Marie Louise violets sold for $1.00 a bunch, and the large single California violet, of rich color and fragrance, in bunches of twice as many flowers, was in demand at $1.50. Bridesmaid, Bride, Meteor, Mrs. Pierpont Morgan and Madame Cusin roses sold for $2.00 to $3.00 a dozen, and perfect buds of Souvenir du President Carnot for $4.00 to $6,00, with specially well-grown ones at $8.00. Plants of Azalea, densely flowered, are becoming conspicuous features in the show windows.

There will doubtless be a scarcity of green vegetables during the next few weeks, owing to the frozen crops in Florida, but California, Bermuda and Cuba have already been drawn upon for string-beans, and other new vegetables will soon come from the southern Atlantic states. On last Monday southern supplies were greatly shortened and prices had advanced considerably. Bunches of new kohl rabi and beets, from Florida, cost ten cents each, string-beans were twenty cents a quart, and tomatoes twenty cents a pound. Peas have doubled in value within a week, and now command $3.00 a peck. The last consignments of southern lettuce realized ten cents a head, but the hot-house supply of this vegetable, from Boston, is abundant, and prices have been as low as fifty cents for a dozen heads within the past few days. New carrots, from Bermuda, cost ten cents a bunch; parsley, peppers and Romaine lettuce come from the same islands, as do onions and potatoes, the latter worth forty cents a half-peck. Cauliflower comes from California by the car-load, and retails at twenty-five to thirty cents a head. Okra, from Cuba, costs ten cents a dozen. Small French radishes, grown under glass near by, bring five cents a bunch; hot-house tomatoes, forty cents a pound, and forced rhubarb, fifteen cents a bunch of a half-dozen stalks. Boston cucumbers readily bring thirty cents each in the entire absence of the southern product, and in some of the high-class fruit-stores they are each wrapped in oiled tissue-paper. Hot-house asparagus is also carefully wrapped, and that from the west sells for seventy-five cents a bunch, while the stouter and longer stalks from New Jersey cost $1.00 for a bunch of about twenty shoots. French artichokes come from Europe regularly each week, as do Brussels sprouts, the latter costing twenty-five cents a pound, while the native sprouts cost twenty cents a quart. Mushrooms have been unusually plentiful and cheap, the best selling at sixty cents a pound.